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Coastal town in Japan destroyed by the tsunami

## EARTHQUAKE AFTERMATH IN JAPAN

On 16th March a video message from Emperor Akihito of Japan was broadcast on Japanese television. This was an unusual event, as the Japanese emperor rarely speaks in public. The broadcast was shown five days after a huge tsunami, triggered by a violent undersea earthquake, destroyed hundreds of towns and villages along the north east coast of the country.

The tsunami, or giant wave, also damaged several nuclear reactors used for generating electricity. The Emperor urged his people to help and to be kind to each other during this difficult time for the country. He also said he hopes those directly affected will strive to survive and not give up hope.

Earthquakes are frequent in Japan. Yet the one that struck in the early afternoon on Friday 11th March was the largest ever recorded in the country. It had

a magnitude of 9.0 on the Richter scale, making it one of the world's biggest.

Japan is made up of four main islands: Kyushu, Shikoku, Honshu and Hokkaido. It has a population of around 127 million. Roughly 75% of the country is very mountainous and nearly all of its people live in the non-mountainous areas. Parts of the country are some of the most densely populated places in the world.

The epicentre of the earthquake was about 130 kilometres (81 miles) off the north east coast of Honshu. The nearest city to the epicentre was Sendai, but the earthquake was so strong it was felt in most parts of the country.

Most buildings in Japan are designed to withstand strong earthquakes. In Tokyo, the capital city, tall skyscrapers swayed, but none collapsed.

Many people who work in Tokyo travel by train. After the earthquake,

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hundreds of thousands of them either had to walk home or stay overnight in the buildings where they work because the trains had stopped. When there is a strong earthquake in Japan every train in the surrounding area is immediately halted. This is so all the tracks can be checked to make sure they have not been damaged.



Close to the epicentre many roads, bridges and one large dam were badly damaged or destroyed. Yet it was the huge tsunami that followed the earthquake that caused most of the destruction.

The earthquake forced a large part of the seabed to suddenly move upwards. This movement pushed up the sea in the ocean above. An enormous volume of seawater was displaced. This displaced water created the tsunami.

A tsunami is not like a large wave you might see at the beach. It can be many kilometres long and is more like a huge surge or series of surges of water. The front of the surge increases in height as it gets closer to the coast. So ships far out to sea may not even notice a tsunami. Damage is caused both when the tsunami rushes inland and when all the water suddenly starts flowing back to the sea again.

Tsunami is a Japanese word that means 'harbour wave'. Japanese fishermen used this name hundreds of years ago. When one happened, they would return from being far out

at sea to find their harbour damaged or destroyed, even though they had not seen any giant waves.

Many towns and villages by the sea in Japan have seawalls built to protect them against tsunamis. They also have loudspeakers to broadcast tsunami warnings. Soon after the earthquake happened tsunami alerts were broadcast all along the north east coast of Honshu. Many people living by the sea rushed to leave their houses to move to higher areas. Yet the huge ten-metre (30 feet) high tsunami arrived very quickly. The seawater surged over the seawalls and destroyed almost everything in its path.

In some areas the seawater reached places ten kilometres (six miles) from the coast. Thousands of houses and buildings were totally destroyed. Large ships were carried far inland. Many people did not have time to escape.

In coastal parts of Japan, as protection against tsunamis, schools are built on high ground. At the time of the tsunami most children in these areas were at school, so they were safe. But many of their parents did not survive.

Rescue workers found it difficult to reach the worst affected areas. Roads and bridges were badly damaged. All the telephone and power lines were cut. Close to the coast, roads were completely blocked by the remains of buildings destroyed by the tsunami. Now around 350,000 people who lost their homes are living in public buildings, such as schools, halls, and hospitals. Officials in Japan say they do not know how many lives have been lost, but think it could be as many as 20,000. Thousands of people are still missing.

The tsunami also damaged the Fukushima nuclear power plant. It

stopped the pumps that keep the radioactive fuel rods covered in water to keep them cool. Several explosions followed. Officials were not sure how much radioactivity might escape from the plant. Everyone who lives within 20 kilometres (12 miles) of the nuclear reactors was ordered to leave. Those living up to ten kilometres (6.2 miles) beyond this area were told to stay indoors and keep their windows closed. Fire fighters and staff at the plant worked in very dangerous conditions to reconnect electricity to the reactors and keep the fuel rods cool.

In some areas there is now a lack of food, water and fuel. Naoto Kan, the prime minister of Japan, has made frequent appearances on television. He has told everyone to stay calm. Many foreign news reporters in the country say they have been amazed at the stoicism shown by the Japanese people in the worst affected areas. Nothing has been stolen, or looted. People are prepared to wait in long queues for food and water and there are few complaints.

Experts estimate it will take many years, and may cost as much as £184 billion (US\$300 billion), to rebuild everything that was destroyed. ■

## FIRST VOTE IN EGYPT

A referendum, or vote in which all adults can take part, took place in Egypt, on 19th March. The vote was to decide on some proposed changes to the rules by which the country is governed, or its constitution.

The vote was the first to be held since a revolution took place in Egypt last month. At the end of January young people began to



gather in Tahrir Square, in Cairo, the capital of Egypt. They were demonstrating against the president, Hosni Mubarak, and his ruling political party the National Democratic Party (NDP). Mr Mubarak had been president for 30 years.



People queue to vote in the referendum in Egypt

The protesters were angry. They wanted free and fair elections, for the police to have fewer powers, more job opportunities for younger people, and freedom of speech. They also accused many senior government ministers of being dishonest and corrupt.

Most people believe the demonstrators were encouraged by what had recently happened in Tunisia. There, protesters who were angry about similar things demonstrated in the streets of Tunisia's larger towns and cities. On 14th January, President Ben Ali and a few members of his family fled the country and travelled by plane to Saudi Arabia. Mr Ben Ali had been president of Tunisia for over 20 years.

In February more and more people joined the protests in Cairo. The army was ordered to move into the city. Yet army commanders decided not to take sides. Eventually, it was announced that President Mubarak would step down. Army leaders said they would take charge, but new elections would be held as soon as possible.

In the referendum people were asked if they agreed with changes

to the constitution. These included a new rule that an elected president may serve two terms of four years only, and that the president must appoint a vice president, or deputy.

The turnout, or number of people who decided to take part, was 41% of the 45 million people eligible to vote. Of these, 77% voted 'yes' to the proposed changes and 23% 'no'. Many of those who voted 'no' said they did so because they want the whole constitution to be rewritten. They believe there should be many more changes than the few proposed in the referendum.

New elections for the country's parliament and president are now expected to take place in September. Until then the army will remain in charge. Many, even those who voted 'no', said the referendum was a success. They claim all elections held when Mr Mubarak was in charge were fixed and not free, so the referendum was the first fair vote to be held in the country for over 30 years. ■

## ST PATRICK'S DAY

Each year, on 17th March, many people around the world celebrate St Patrick's Day. For many, St Patrick's Day is a religious holiday on which special church services, parades and parties take place.

St Patrick is the patron saint of Ireland. A patron saint is one chosen to represent a particular group of people or a country. The island of Ireland is made up of the Republic of Ireland (an independent country, commonly known as Ireland) and Northern Ireland, which is part of the UK.

St Patrick was a Christian saint. This means he was someone who

## NewsCAST

**UNWANTED PASSENGER** — Emergency services in Florida, in the USA, received a phone call from a boat captain saying one of his passengers had been injured. The captain told them he was bringing his boat back into harbour. When it arrived, emergency workers saw there was a large dolphin in the boat. The tourists on the dolphin-watching boat trip explained that it had accidentally ended up in the boat after leaping out of the water. The dolphin landed on a woman's foot and sprained her ankle. The emergency workers said the dolphin was not hurt and it was released back into the sea.

has been officially recognised as a very holy person by the Christian Church. Although there are many legends about St Patrick, he was a real person. He is believed to have lived sometime between the years 380 and 460.

It's thought St Patrick was born in Britain. As a young man he was captured and taken to Ireland as a slave. He eventually escaped and returned to Britain. Later, he became a priest and then went back to Ireland to teach the people living there about Christianity.

One of the most famous legends about St Patrick was that he **banned** all the snakes from Ireland. Today, although there are a few types of snakes found in the UK, there are none in Ireland.

One symbol of St Patrick's Day is the shamrock, also known as a clover. Each stem of the plant has three leaves. Stories about St Patrick say he would use the shamrock as a symbol to teach people about

Christianity. Christians are taught there is one God, but that He has three parts that make a whole: the Father (God), the Son (Jesus) and the Holy Spirit. The three-leaved shamrock is used to demonstrate this belief, which is known as the Holy Trinity.



*St Patrick's Day parade in the USA*

St Patrick's Day is celebrated in many countries because throughout history people from Ireland have travelled all around the world and settled. Large numbers of Irish people emigrated, or moved, to other countries during the 1800s. As when people emigrate now, it was often in the hope of finding a better place to live where they could get a job and earn a living. In the 1800s there were several **famines** in Ireland so many people wanted to leave.

Tens of thousands of Irish people travelled to other parts of the world, including New Zealand, Australia, the Caribbean, North and South America and the UK. Millions of American and Canadian people are descended from Irish immigrants. There are now believed to be about 80 million people descended from those who left Ireland between the late 1700s and early 1900s. This is known as the Irish **Diaspora**. Today the population of Ireland and Northern Ireland combined is only about 6.5 million.

In the eastern Canadian province of Newfoundland and Labrador, St Patrick's Day is a public holiday.

This is to recognise the original Irish settlers from whom many people in the province are descended.

Many cities in the USA organise annual St Patrick's Day parades. The largest is in New York City. Many groups take part, including marching bands and traditional Irish dancers. Over two million people lined the streets of New York to watch this year's St Patrick's Day parade. ■

## POPULAR POLAR BEAR DIES

On 19th March the zoo in Berlin, the capital of Germany, announced that Knut, a four-year-old polar bear, had died. During his short life Knut had become famous throughout Germany and in many other countries.

Knut was born at the end of 2006 at Berlin Zoo. Soon after he was born his mother rejected both him and his brother. She left them alone on a rock in her enclosure. It was not known why she did this. In the wild, polar bears will sometimes reject their cubs and even kill and eat them if they are weak or sick.

Zoo officials knew the cubs would die if they were left alone so they decided to rescue and hand-rear them. This meant it would not be possible to reunite them with their mother in the future, as she would probably attack them.

Within a few days, Knut's brother died, but Knut survived. At the time some people said it was wrong for Knut to be hand-fed by a keeper and treated like a pet. This, they argued, was an unnatural way to treat a wild animal, and said it would have been better to have let the cubs die after they were rejected by their mother.

Hundreds of people demonstrated outside the zoo. They wanted Knut to be kept alive. At first the

polar bear was looked after by his keeper and fed on porridge made with milk, cat food and vitamins. When he grew bigger he was given his own enclosure in Berlin Zoo. Most experts agreed that Knut could never be released back into the wild, as he would not have the skills to survive.

The number of visitors to Berlin Zoo increased because of Knut and the zoo made a lot more money. This caused an argument with another zoo in Germany. This zoo had sent its male polar bear to Berlin Zoo to mate with the female bear that had the two cubs. The other zoo said it had an agreement that it would own the first polar bear cub born to the male and female bears. This cub was Knut. In the end a judge had to settle the argument.



*Knut*

As Knut grew up, his bright white fur turned the yellowish colour of adult polar bears. He put on weight and developed a liking for croissants. The bear also seemed to need spectators to be happy. Some people believe he suffered from a form of depression.

On 19th March Knut was walking around his enclosure when he suddenly collapsed and fell into the water. Zoo officials say they will investigate why he died. Experts say polar bears in the wild live for about 20 years, and it is not unusual for those in zoos to live much longer than this. ■

## MEASURING EARTHQUAKES

by Anna Grayson

Earthquakes are recorded in many places around the world on instruments called seismometers. On Friday 11th March, seismologists – scientists who study earthquakes – watched as their seismometers began to record a huge earthquake.

All earthquakes produce two types of waves, which travel through the Earth. By measuring the time between these, seismologists can calculate how far away from a seismometer the earthquake happened. By comparing results recorded by other seismometers, in different parts of the world, they can work out exactly where it occurred. It's also possible to estimate how deep underground the earthquake was and its magnitude on the Richter scale.

The Richter scale is a measure of the amount of energy released at the focus, or centre, of an earthquake, beneath the Earth's surface. It is not like a ruler with equal spaces between the marks. Points on the scale mean vastly increasing values as the numbers get bigger. The earthquake in Japan was 9.0 on the Richter scale – the fourth-largest ever recorded.

Movements in the Earth's crust cause stress to build up in the rocks deep underground. This stress can cause the rock to snap. When this happens it usually takes place along a fault – an area or zone that is already weak.

In Japan faults are associated with the movements of the huge tectonic plates that make up the Earth's crust. East of Japan, the Pacific Ocean plate is being pushed down underneath the northern part of the country. The Pacific plate is moving, at a few centimetres a year, back into the interior of the Earth. Seismologists call this a subduction zone.

There are active subduction zones nearly all the way around the Pacific Ocean. These are associated with both volcanoes and frequent earthquakes. This is why the outer edge of the Pacific Ocean is sometimes called 'The Ring of Fire'.

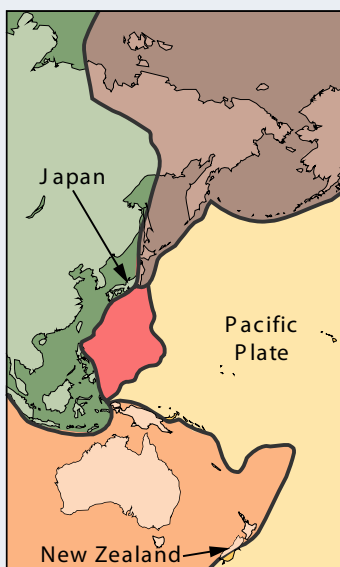
As they quickly worked out that the earthquake had taken place under the sea, seismologists immediately issued a tsunami warning. The earthquake **ruptured** a 400 kilometre (248 mile) long section of the seabed. The sea floor was pushed three metres (ten feet) upwards. This powerful, sudden upward movement created a huge wave, or tsunami, which travelled outwards from where the earthquake occurred. Only 30 minutes later the tsunami crashed into the north east coastline of Japan. Many hours later it reached the other side of the Pacific Ocean, although by this time it had lost most of its power.

After an earthquake, scientists measure the damage it caused. This is called the intensity (which is different from the magnitude). Japan is mostly made up of solid rock. Houses and larger buildings are designed to withstand the strong movements of powerful earthquakes. On this occasion it was the tsunami and not the earthquake that caused nearly all the loss of life and the destruction of thousands of buildings and houses.

The earthquake in Japan was roughly 11,000 times stronger than the one that occurred in Christchurch, New Zealand, on 22nd February. The New Zealand earthquake had a magnitude of 6.2 on the Rich-

ter scale. Although, like Japan, New Zealand is on the Ring of Fire, the fault line that runs under it is different. Here two plates slide in a horizontal direction past each other, instead of one under the other. It was also only five kilometres (three miles) below the surface. The Japanese one was five times as deep.

In Christchurch many buildings either fell down or were so badly damaged that they cannot be repaired. Much of the city was built on soft **sediment** and not on harder rock. This sediment can act like a liquid when shaken by an earthquake. This is why many buildings in Christchurch were so badly damaged.



Map showing where different plates meet on the western side of the Pacific Ocean



## NEW MOBILE STAMPS

The post office in Denmark has announced a new service that can be used instead of buying stamps. The service involves sending a text message to the post office. The cost of the 'text' stamps is then listed on the sender's mobile phone bill.

From the beginning of April people wanting to post a letter or small parcel will be able to send a text message to the post office. Within a short time, an automated reply will be sent to the person's mobile phone. This text message will include a code. All the person has to do is write the code on the envelope where the stamp would normally go.

The first postage stamp designed to be stuck onto an envelope containing a letter was invented in the UK. Called the 'Penny Black', it was first



*Penny Black*

used in 1840. Before this it was normal for the recipient, or person who received the letter, to pay for the letter. The Penny Black therefore made it possible for the sender to pay. Today original Penny Black stamps are worth a lot of money.

The Danish post office said that its new service is not meant to be a replacement for stamps, as it will continue to sell them. The cost of receiving the code from the post office will be added to the person's mobile telephone bill.

Technology experts predict in the near future we'll buy many things using a mobile phone payment service like this. One reason is that today mobile phones are very common. As people receive a bill for all their mobile calls and texts it would be possible for other items to be listed on the same bill. For this to work, companies that wish to sell items in this way will have to make special arrangements with the mobile phone companies that send out the bills.

In some countries such as South Korea it is already possible to buy things such as train tickets with a mobile phone. Sweden has announced that it too plans to launch a text postal service in the near future. ■

## NUCLEAR POWER

The damage caused to the Fukushima nuclear power plant, in Japan, has meant many governments have decided to check, or review, the operations of their own nuclear power stations.

The Fukushima plant was hit by the tsunami, or giant wave, which

followed the earthquake in northern Japan on 11th March. The electricity supply at the plant was knocked out. The pumps designed for emergency use stopped, so water could not be pumped into the tanks where the nuclear fuel rods are kept.

The rods help to create steam that turns turbines. It is the turning of these turbines that generates the electricity. The failure to keep some of the rods covered in water led to several explosions. This meant some radioactivity escaped into the air. In large doses radioactivity can kill people, or cause diseases such as cancer.

On 15th March Angela Merkel, the chancellor of Germany, said she had ordered seven nuclear plants to close for a short period. These plants had all begun working before 1980. She explained that as they are Germany's oldest plants it is necessary to check they are safe.

On the same day, the European Union (EU) said all 143 nuclear plants in its member countries, including Germany, will be inspected. Of the 27 members of the EU, 14 use nuclear power.

France, with 58 nuclear reactors, has the most. It gets 80% of the electricity it uses from nuclear power. Barack Obama, the president of the USA, also announced that all nuclear power stations in America will be re-checked.

China currently has 13 nuclear reactors that generate about 2% of its electricity. Most of its electricity comes from burning coal. Coal, like oil and gas, is a fossil fuel. It releases large amounts of carbon dioxide into the air when it is burnt. Most scientists agree that extra carbon dioxide in the atmosphere is helping to increase global warming and climate change. China is in the process of building 27 new nuclear reactors.

## NEWSCAST

**COUNTDOWN STOPS** — On 14th March a clock was unveiled in Trafalgar Square, in London, the capital of the UK. The clock is set to count down the 500 days until the 2012 Olympic Games open in the city. The 500th day countdown also marked the day on which people could apply for tickets for the Olympic events. The clock began its countdown during a special ceremony, which was attended by four UK Olympic medal winners. Yet after only seven hours it stopped working. Its owners managed to restart the clock and explained that there had been a technical problem, which should not happen again.

On 17th March it too said it will be checking all its nuclear sites and that the building of new plants will be halted for a time.



*Fukushima nuclear power plant in Japan*

Many environmentalists say the accident at Fukushima proves nuclear power is unsafe. Even if the nuclear stations are built far away from earthquake zones, they claim, there is always the danger of an accident happening. They believe all countries must make much more of their electricity from wind, wave and solar power. All of these, they argue, do not produce carbon dioxide and are renewable. Yet many energy experts insist it will not be possible, for many years, to generate the electricity needed in this way, especially as the amount required keeps increasing. They therefore say the only alternative to burning fossil fuels, for at least the next 20 years, is nuclear power. ■

## NAKED NECK CHICKENS

Scientists at a university in Scotland, in the UK, have studied the genes of a type of chicken from Central Europe to try to find out why it looks so unusual.

The Naked Neck, or Transylvanian, chicken has feathers on its body, but none on its neck. Because of its strange appearance the chicken has been nicknamed the 'turken'. This is because its body is similar to a

chicken's, yet its neck looks like that of a turkey.

There are several types of bird that have no feathers on their necks, such as ostriches and vultures. Scientists say this can be because these birds live in hot climates. Having no neck feathers means it is easier for them to keep cool. Yet Central Europe, where the Transylvanian chicken comes from, does not have a very hot climate. The scientists decided to look at the turkens' genes to try to find out how their bodies stop feathers from growing on their necks.

Some parts of animals' bodies can be different but look similar. For instance, a bird's tail and wing feathers are different from those on their bodies. This is because the wing feathers are designed for flying. Yet even though the feathers look different, they are still feathers. The scientists therefore wanted to work out what stopped feathers from growing at all.

The cells of living things contain genes, or coded information, which control all their features. For example, some of our genes control what colour our hair or eyes are. These codes tell the cells how to develop. Also contained in our cells are proteins that tell the cells when to stop and when to start changing, or developing. For instance, our bodies keep producing cells throughout our lives. As cells get old and 'worn out' new cells replace them. The proteins switch on a signal that starts the process that makes new cells, and switches off the signal when there are enough cells.

The scientists discovered proteins in Transylvanian chickens' bodies that switched on and switched off the signal to develop, or grow, feathers. The switching-off signal protein is called BMP12. Then they

examined the cells in the skin on the birds' bodies and compared it with cells from the skin on their necks. The scientists discovered several differences between the cells. They wondered if these differences meant the neck and body skin cells reacted differently to the BMP12 protein.

To test their ideas, the scientists used chicken **embryos** from a breed of chicken that does have feathers on its neck. They treated the embryos with the switching-off protein, BMP12. When the baby chickens hatched and grew, their necks were naked and did not have feathers.



*Turken*

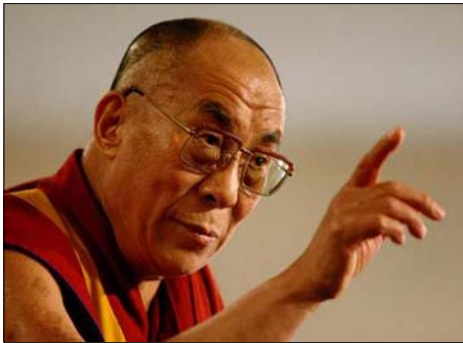
The scientists therefore think chickens' neck skin cells must be more sensitive to BMP12 than their body skin cells. And, for some reason, Transylvanian chickens have more BMP12 in their bodies than other types of chicken. Although they do not know why this is, the scientists believe it explains why turkens' neck skin cells do not grow feathers. ■

## DALAI LAMA RETIRES

On 14th March the Dalai Lama formally announced he has decided to retire. For 50 years he has led Tibet's government-in-exile, in the city of Dharamsala, in northern India. Yet the Dalai Lama insists he is retiring only as his government's political leader. He will continue to

be the spiritual, or religious, leader of those that follow Buddhism.

Tibet is a mountainous region in southern China. Chinese leaders have always insisted the region is part of China. However, many Tibetans have claimed that their homeland is a separate country. In 1950 the Chinese army marched into Tibet. China said Tibet had an unfair system where people in senior positions had too much power and ordinary people were treated badly. It said it wanted to stop this.



Dalai Lama

A few years later some Tibetans staged an uprising against the Chinese authorities, but it failed. Thousands of Tibetans were killed. Many, including the Dalai Lama, fled across the borders into northern India and Nepal. They eventually settled in Dharamsala, where they set up a Tibetan government-in-exile.

The Dalai Lama has become well known throughout the world. He has travelled to meet and talk with world leaders in many countries. In 1989 he was awarded the Nobel Peace Prize. However, Chinese leaders distrust him. They believe he wants Tibet to be a separate country. The Dalai Lama insists this is not true. He says he is happy for Tibet to remain part of China, but wants the region to have more **autonomy**.

China says it has improved the living standards of many Tibetans. Since 1950 it has built many new

## NewsCAST

**BIRD CHEAT** — A pigeon breeder in Germany has been caught cheating. One of his pigeons had won prizes at two important bird shows. Yet when officials checked the bird more closely they discovered its owner had glued feathers into its tail to make it look better. The officials said they were suspicious because the bird's tail looked 'too perfect'. The breeder claimed some of the pigeon's own feathers had fallen out, so he used glue to stick them back on. He insisted he did not add any. The breeder has been banned from competitions for a year and was ordered to repay his prize money.

buildings and roads. A modern railway – the highest in the world – connecting Beijing, the capital of China, and Lhasa, Tibet's largest city, was opened in 2007. However, the Dalai Lama and his followers worry that this modernisation is destroying traditional Tibetan customs and ways of life. He believes if Tibet were allowed to govern itself within China, these could be protected.

The Dalai Lama is now 75 years old. Many think he has decided to retire as a political leader because he is worried about what might happen after he dies. They believe he wants a non-religious Tibetan person to take over the political leadership of his government-in-exile. This is so the struggle to get Chinese leaders to agree to an autonomous, or self-governing, Tibet within China will continue.

Buddhists believe the Dalai Lama is **reincarnated** when he dies. This means Tibetan religious leaders must discover where the reincarnation has happened. Traditionally they use dreams, rituals and tests

to identify the reincarnated Dalai Lama. Usually a child of only two or three years of age is chosen. He is then looked after until he grows up. Some Tibetans fear Chinese leaders may try to claim they have found the new reincarnation when the Dalai Lama dies.

On 20th March thousands of Tibetans living in northern India and many other countries voted in an election to choose their new political leader. The result will be announced at the end of April. ■

## MESSENGER ARRIVES

NASA's (National Aeronautics and Space Administration) *Messenger* spacecraft successfully went into orbit around the planet Mercury on 18th March. The craft was launched in 2004, so its journey to the smallest planet in the Solar System and the one closest to the Sun took over six years.

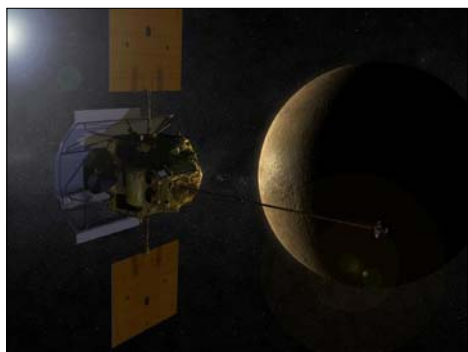
Only one other spacecraft has ever visited Mercury. In the 1970s *Mariner 10*, another NASA probe, flew past the planet. *Mariner 10* managed to photograph some of Mercury's surface. The planet has a magnetic field and an iron core, both of which are similar to the Earth's. Yet, even though Mercury is much smaller than the Earth, the two planets' cores are believed to be about the same size.

The name Mercury comes from the Romans. They named it after one of their gods, Mercury, a messenger and god of communications. A 'year' on Mercury is about 88 days, as this is the length of time it takes the planet to orbit the Sun.

Mercury has a wide range of temperatures. During the day it can get four times as hot as boiling



water, and at night it can be colder than  $-100^{\circ}\text{C}$  ( $-148^{\circ}\text{F}$ ). *Messenger* has been made of materials that are not affected by the heat. The equipment it carries is also designed to operate in very high temperatures.



Artist's impression of Messenger and Mercury

*Messenger's* voyage has taken so long because it has not travelled directly to Mercury. If it had, it would have been difficult to slow the spacecraft down enough for it to go into orbit. This is because the gravitational pull of the Sun would get stronger and stronger as it approached Mercury. So *Messenger* travelled around the Earth first, around Venus twice, and then three times around Mercury before settling into orbit around the planet.

*Messenger* has already taken many detailed photographs of Mercury's surface. These show it has many craters and a series of very long cliff faces. Scientists think these cliffs may have been formed as the outer surface of the planet shrank.

While in orbit around Mercury *Messenger* will take close-up photographs and make very detailed maps of the planet's entire surface. Scientists are sure there is no life on Mercury, as it gets far too hot. However, they believe the information *Messenger* sends back will help them to learn more about how rocky planets are formed and the history of the Solar System. ■

## NEPAL BANKNOTE CHANGE

The government of Nepal has decided to change the banknotes used in the country. Starting from 15th March, any banknotes with a picture of a king on them must be exchanged for ones with a new design.

Most countries have their own currencies, or coins and banknotes. For example, the UK has pounds and pence, the USA, dollars and cents, and Russia, roubles and kopeks. Some European Union (EU) member countries, such as France and Germany, decided to stop using their own currencies about ten years ago, and use the euro instead.

Countries choose the designs for their banknotes and coins. Often notes show important historical sites or famous people. For instance, in Mexico the ten peso note has a picture of Emiliano Zapata, one of the leaders of the successful Mexican revolution in the early 1900s. Countries that have a monarchy, or royal family, often have pictures of their kings or queens on their banknotes.

One important thing for countries to decide when designing their banknotes and coins is how to make them impossible, or very difficult, to copy. Copying money and printing fake notes is called counterfeiting, or forgery. Counterfeit money can cause governments big problems. So banknote designs are often very complicated, with tiny details in the printing and watermarks in the paper, to make them difficult to forge.

Nepal's currency is called the Nepalese rupee. This is because there are several other countries, such as India and Sri Lanka, whose currencies are also called rupees. Many Nepalese rupee banknotes have a picture of former kings on them, including King Gyanendra.

Gyanendra became the king of Nepal in 2001. Before he became king, a group called the Maoists had taken control of some parts of the country. One of the things they wanted was to get rid of the monarchy.

King Gyanendra believed his country's government was not doing enough to defeat the Maoists. In 2006 he shut down Nepal's parliament and took over the running of the country himself. Many people disagreed with his actions.

The United Nations (UN) eventually helped to arrange a peace agreement in Nepal. The Maoist leaders agreed to stop fighting and take part in elections. When the elections were held Maoist supporters got most of the votes. The Maoist members of parliament then voted for Nepal to change from a monarchy to a republic. This meant Nepal would have an elected or appointed president and not a king as its head of state.



Nepalese rupees. Top: Banknote with a picture of King Gyanendra. Bottom: Banknote with a picture of Mount Everest

In 2008 King Gyanendra was forced to step down. New notes with a picture of Mount Everest on them were introduced. Yet many of the country's older banknotes still have either his or the previous king's picture on them. Until the government's recent announcement, it was

still possible to use the notes with the king's portrait on them.

After the announcement many people immediately queued at banks to swap the old banknotes for new ones. However, the government says they may be exchanged any time within the next three months.

The former king still lives in Nepal as a civilian. He calls himself Mr Gyanendra Shah. ■

## WARNING OF CIVIL WAR IN YEMEN

On 21st March Ali Abdullah Saleh, the president of Yemen, warned a civil war may break out in his country. He gave the warning soon after several senior military commanders decided to resign and join groups of protesters who have been demonstrating in the streets of Sanaa, the capital city, for many weeks.



*Demonstration in Yemen*

Yemen is one of the Arab countries in which demonstrations have been taking place since the beginning of the year. Similar to protesters in Tunisia, Egypt, Bahrain, and Libya, many people in Yemen have been protesting about how their country is governed. They have been complaining about unfair elections, a lack of jobs, and corrupt and dishonest government officials.

The protesters have been demanding that Mr Saleh, who has

been president for the last 32 years, resign. He has already announced he will not stand again in the next election, which will take place in 2013.

Many of the demonstrations have taken place in the centre of Sanaa. On 18th March, after over four weeks of protests in the city, gunmen hiding on the roofs of buildings fired at the crowds of demonstrators. Around 50 people were killed and many more injured. After this incident several senior government officials said they could no longer support the president.

On 21st March an army general announced that he and the soldiers he commands would be joining the protesters. He then ordered his tanks and soldiers to protect the demonstrators in the capital city. Yet other parts of the army, some of which are led by the president's son, have said they will continue to support President Saleh. The army is now divided, which is why the president has warned that a civil war could break out.

On 23rd March President Saleh said Yemen's parliament had passed some new laws. These give greater powers to the army and police and make it harder for people to take part in demonstrations without being arrested.

The events in Yemen have caused a problem for the USA. Traditionally it has supported President Saleh. This is because he has helped the American government to track down members of al-Qaeda. Al-Qaeda is the militant group that attacked the USA in 2001. In recent years members of al-Qaeda have

been trying to use Yemen as a base from which they can plan future attacks. ■

## OUTSIDE FORCES ENTER BAHRAIN

On 14th March around 2,000 troops and police from Saudi Arabia and the United Arab Emirates (UAE) entered the island kingdom of Bahrain. They drove military trucks across the 25 kilometre (16 mile) man-made causeway that connects Bahrain and Saudi Arabia.

Anti-government protests have been taking

place in Bahrain for over a month. There are two main religious groups in the country, which has a population of about one million. Around 70% are Shia Muslims and 30% are Sunni Muslims. The king and nearly all of the people who run the country are Sunnis. Bahrain does have a parliament, yet this does not have much power. The king and members of his family make most of the important decisions. The country has had the same prime minister, who is also related to the king, for the last 40 years.

The demonstrators say they want the country to be a proper constitutional monarchy. This means the king would remain head of state, but there would be a democratically elected parliament, which would make all the important decisions.

Most, but not all, of the demonstrators are Shias. They claim it's difficult for them to find work and complain that the most important jobs in the country are closed to



Shias. The protesters also accuse many senior people in the country of being dishonest and corrupt.

Many protesters have been gathering in Pearl Square, in the centre of Manama, Bahrain's capital city. The Bahraini police and army have tried to remove them several times. Shots have been fired and several people killed. But the protesters have always returned. This is similar to recent events in Cairo, the capital of Egypt. There, protests eventually caused Hosni Mubarak, the president of Egypt, to stand down.



*Pearl Monument in Manama before it was knocked down*

The arrival of troops from Saudi Arabia and police from the UAE followed a meeting of the Gulf Cooperation Council (GCC). This is an organisation with six member countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE. A Sunni king, or sultan, rules each member country. GCC countries agree to help any member if it is attacked or threatened. Many people think it was the GCC's decision to send the **reinforcements** to Bahrain.

The day after the extra troops and police arrived, they helped the Bahraini army and police to force the protesters away from Pearl Square. It was reported that six demonstrators and three policemen were killed in the violence. All the protesters' tents and other items they had brought to Pearl Square were destroyed.

In the centre of the Square is a large structure called the Pearl Monument. On 18th March government forces deliberately destroyed it. The memorial was put up in 1982 to commemorate the first meeting of the GCC in Bahrain. It was designed to look like six dhow sails with a pearl on the top. A dhow is a traditional Arab sailing boat. Each sail was meant to represent one of the members of the GCC. The government said it had decided to knock down the monument because the protesters had **desecrated** it.

Some Shias in Bahrain now claim their country has been invaded and occupied by Saudi Arabia. Many think the leaders of the GCC countries want to make sure that what happened in Egypt doesn't happen in their own countries. Others think these events might cause even bigger problems. Saudi Arabia and Iran traditionally dislike each other. Saudi Arabia is mostly a Sunni country, while Iran is mainly Shia. Some now worry that Iran may soon decide to support the Shias in Bahrain, which could lead to a war. ■

## SUPER MOON

On 19th March, the Moon's orbit brought it to its closest point to the Earth. This happens frequently, but this time was unusual because it occurred at the same time as a full Moon. This is sometimes called a 'Super Moon'.

The Moon's orbit of the Earth is not a perfect circle – it's an ellipse, or oval shape. When the Moon is at the furthest part of the ellipse it's called the lunar apogee, and at its closest, the lunar perigee. So the Moon was at its perigee on 19th March.

The Moon goes through different phases as it orbits the Earth. These

phases are related to the Earth's orbit of the Sun as well. The phases of the Moon – or the portion of the Moon we can see on any one night – depend on where the Earth, the Moon and the Sun are in relation to each other.

One half of the Moon is always illuminated, or lit up, by the Sun's light. But the Earth is not always positioned to be able to see all of the illuminated part. Sometimes we are at an angle where we can only see a portion of the illuminated part, while the rest of the Moon is in darkness.

When there is a new Moon, all we can see is darkness. This is because the Moon is between the Sun and the Earth. The illuminated half of the Moon is facing away from us and we can only see the shadowed part. A full Moon is the opposite of the new Moon. Then, we can see all of the illuminated part and it looks like a full circle. The Moon's cycle lasts for about 28 days, so we see all the phases of the Moon roughly

## NewsCast

**NUTS STOP CAR** — A driver in the UK was having trouble with his car radiator and drove it to a garage to have it fixed. He was very surprised when the mechanic called him to let him know what was wrong. It had nothing to do with the radiator. An air intake pipe was blocked with peanuts. The mechanic was surprised the car worked at all. The car's owner said the peanuts must have been stored there by a squirrel taking the food he puts out for garden birds. Mechanics say rodents getting into cars and making nests can sometimes be a problem for people living in country areas.





once a month. The Moon is therefore at its apogee and perigee about once every two weeks.



*The Moon at its perigee and apogee showing the difference in size when seen from the Earth*

At the apogee the Moon is about 410,000 kilometres (254,000 miles) away from the Earth. At its perigee the distance is roughly 354,000 kilometres (220,000 miles) – a difference of around 56,000 kilometres (35,000 miles). So at its perigee the Moon, when seen from the Earth, is about 14% bigger and 30% brighter than when at the lunar apogee.

Scientists say it is not always easy to see this difference. Yet on any night the Moon seems to look bigger when it is closer to the horizon, as opposed to high in the night sky. This is actually an optical illusion, but it means the best time to notice the size of the Super Moon is to look at it when it is close to the horizon.

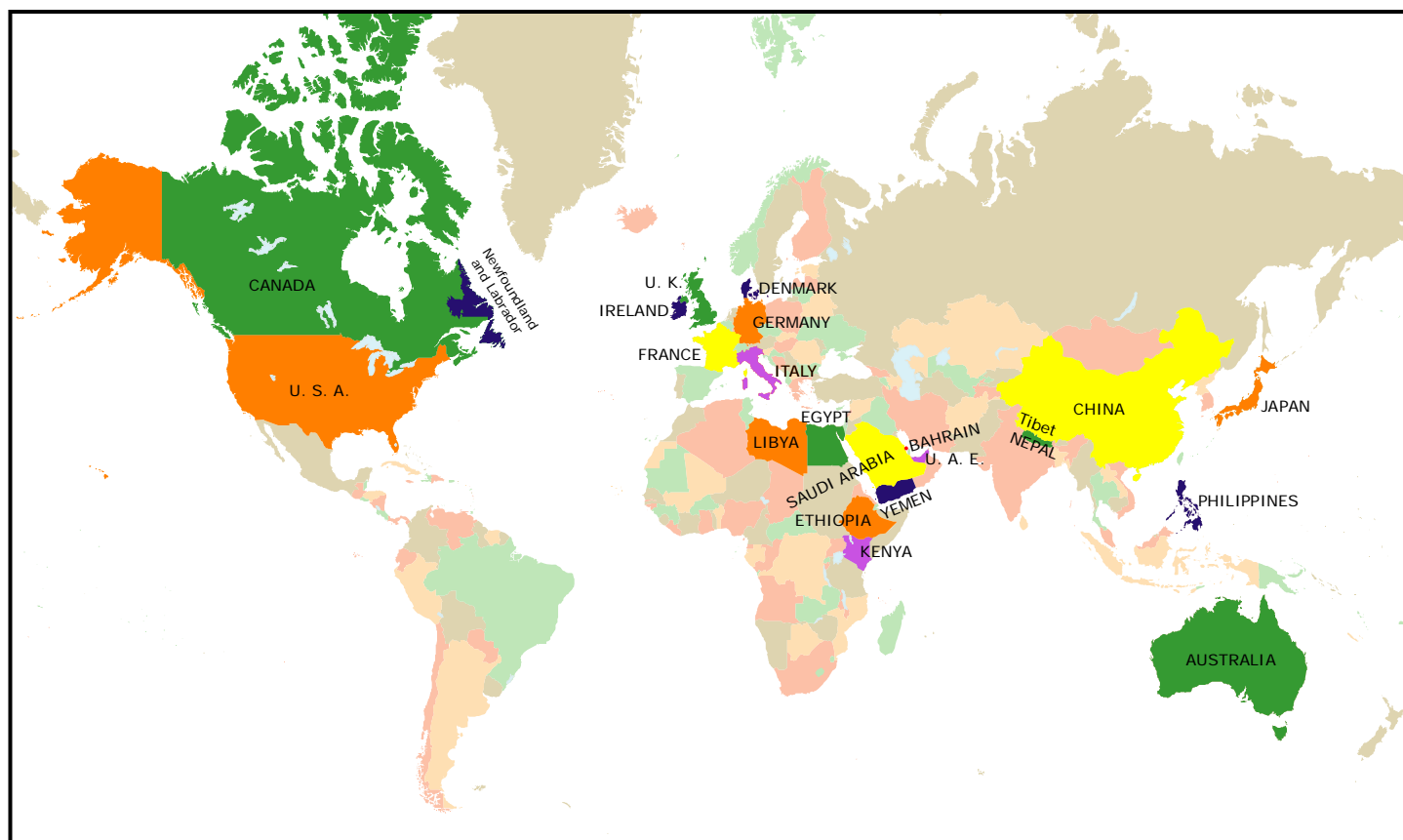
If you missed the Super Moon on 19th March you will have to wait a long time to see one. The next full Moon at the lunar perigee will not happen until 2016. ■

## OLD ELEPHANTS KNOW BEST

Getting older really does make you wiser – at least, it does if you are an elephant. Scientists working in Kenya have discovered that herds led by older elephants reacted better to danger than those led by younger ones.

Elephants – the world's largest land animals – have often been associated with wisdom and intelligence. The saying 'an elephant never forgets' shows the popular belief that they have a long memory. Yet scientists think this may be true. Elephants have been observed doing things that more intelligent types of animal, such as certain primates (apes) and dolphins, are known to do. These include showing grief when a member of the herd dies, using tools, and helping to look after the babies of other elephants.

Elephant herds are made up almost entirely of female elephants. The only males are youngsters. When male elephants grow into adults they live on their own. The lead elephant of the herd is known as the matriarch. The other females in the herd act on the 'instructions' she gives by her



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behaviour – for example, moving to a new place to feed or find water.

Adult elephants have no natural predators (apart from human hunters). They are even too big for a lion to hunt down and kill. As well as being large, elephants can be very aggressive when they are threatened.



*Elephant herd*

However, lions can sometimes catch and kill young elephants (called calves). If a lion can separate a baby elephant from the herd it is quite easy to kill it. This is where elephants in herds benefit from looking after each other's calves. If a lion is nearby, the herd groups together to protect the younger ones.

Scientists who study packs of lions know female lions do most of the hunting for food. Elephants have therefore learnt to be very aware of female lions' behaviour and the roars they make. Although male

lions do not often hunt, if they do, they are more likely to choose a large animal such as a young elephant. This means male lions are as great a threat to elephants as female lions.

The scientists played recordings of male and female lions roaring to different herds of elephants. They all reacted to the female lions' roars and grouped together to protect the calves. Yet some matriarchs hardly reacted at all when they heard a male lion roaring, even though it is a danger. The matriarchs that did react quickly to the male lions' roars – and organised their herds to protect the calves and be aggressive to the male lions – were the older ones, or those over 60 years old.

These older matriarchs also stayed alert for a long time after first hearing the male lion's roar. The scientists think their experiment shows the oldest female elephants are the best leaders. These elephants, they believe, are using their longer experience and years of learning to make the best decisions. ■

## RED NOSE DAY

Comic Relief is a charity based in the UK. On 18th March it celebrated its biannual fund-raising event, Red Nose Day. This year Comic Relief broke its record by raising more than £73 million (US\$118.4 million) on the night of its live televised Red Nose Day event.

Comic Relief was set up in 1985. It was launched to draw attention to a serious famine in Ethiopia. At the time many people were dying in the country from a lack of food.

The original idea was for a group of comedians from the UK to take part in events, all on the same day, to help to raise money. This would

then be used to help those suffering from the famine in Ethiopia. Soon the day of events became known as 'Red Nose Day'.

The first Red Nose Day live fund-raising event was held in 1988. It raised £15 million (US\$24 million). As well as comedians and celebrities doing funny sketches, many of them travelled to different parts of the UK and Africa to meet people who needed help from Comic Relief's charity projects.

Although Red Nose Day is now Comic Relief's biggest fund-raising event, the charity's projects run all year. Comic Relief supports projects such as United Against Malaria, to raise money for mosquito nets; raising awareness of, and providing education about, HIV/AIDS in African countries; and Girls Express, a UK charity that helps girls who self-harm.

**COMIC  
RELIEF**

Comic Relief pledged £10 million (US\$16 million) to support health and education projects in Africa. The UK government then announced it would match Comic Relief's amount, so the support that will go to those projects is now £20 million (US\$32 million).

As well as donating money, many people around the UK organise and take part in sponsored events to encourage other people to donate too. This year these events were called 'do something funny for money'. One was a group of 3,910 people all playing the kazoo at the same time,

a world record. A kazoo is a small wind instrument that is blown or 'hummed' into. David Cameron, the prime minister of the UK, even took part. He acted in a sketch shown on a television cooking programme.

People can also buy specially made red noses to wear on Red Nose Day. The money used to buy these goes to Comic Relief's charity projects.

Since Comic Relief was first launched, it has raised more than £650 million (US\$1.05 billion) for projects in the UK and in African countries. ■

## BOUNCE STUDY

Researchers in Australia have used motion-capture technology to learn more about how kangaroos move around.

The science of studying the movements, or mechanics, of living things, is called biomechanics. The team of researchers from universities in the USA, the UK, and Australia got together at a zoo in Brisbane, in Australia, to study the biomechanics of kangaroos.

Kangaroos are marsupials native to Australia. They are the largest animals in the world with their particular body shape and way of moving. Kangaroos have very big powerful back legs and move with a jumping, or hopping, motion, pushing themselves forward with both back legs at the same time. They are able to travel far at speeds of around 20 kilometres (12 miles) per hour. Over short distances they can go as fast as 40 kilometres (25 miles) per hour.

The biomechanical researchers borrowed equipment from a film studio to do their study. This included motion-capture sensors that can

be attached to the body, and high-speed cameras.

Many animated films are made by attaching motion-capture sensors to actors. The sensors record the actors' movements. The animated film characters can then be digitally built up around these recordings using computers. In the kangaroo experiment, the sensors were attached to the outside of the kangaroos' bodies, at the joints of their large back legs.



Kangaroos

In many species, as individuals grow bigger, they become more and more upright as this is the most efficient way of moving around. Biomechanists call this 'reducing the mechanical demand' on the muscles. This means the muscles don't have to work as hard. Yet kangaroos don't do this. Even large adult kangaroos have quite a low, crouched posture. They stay in this position whether going quickly or slowly. This, say biomechanists, is odd, as they would expect a large animal to damage its skeleton and muscles if it travelled quickly in this position. But it does not seem to affect the kangaroo.

The researchers created a short tunnel for the experiment. They then used cameras to digitally record the movements of the kangaroos' joints as they travelled along the tunnel at different speeds.

The researchers now have a lot of recordings of kangaroo movements.

They hope by studying these they will be able to work out how kangaroos can travel as they do without doing any damage to their bodies. ■

## NO-FLY ZONE ENFORCED

On 18th March the United Nations (UN) Security Council voted on a new resolution, or formal proposal. A majority of the 15-member Council voted for the resolution, which officially authorised several UN member countries to set up a no-fly zone over Libya.

UN resolutions are given a number. The one authorising the no-fly zone is 1973. Within 24 hours of the vote on the resolution taking place, fighter planes from France had attacked forces loyal to Muammar al-Gaddafi, close to Benghazi, the second-largest city in Libya.



UN Security Council meeting

The unrest started in Libya at the beginning of February. People in Benghazi began demonstrating against Colonel Gaddafi, the Libyan leader. The demonstrators were protesting about the way in which they have been governed for the 40 years of Colonel Gaddafi's leadership.

The protests soon spread to other parts of the country, including Tripoli, the capital city. Some members of the army and the police joined the demonstrators. Many predicted Colonel Gaddafi and the



people who worked for him would be forced to leave the country. Yet those loyal to Colonel Gaddafi began to successfully fight back. One of the main reasons for their success is that they have better military equipment than the anti-government demonstrators, known as the rebels.

Within a few weeks the loyalists had defeated the rebels in most of the towns and cities. The only large city still held by the rebels was Benghazi. Many people in other countries worried that if the loyalists entered Benghazi there would be a [massacre](#). Colonel Gaddafi had already threatened to kill all those who had demonstrated against him in the city.



Several countries, especially the UK and France, suggested a no-fly zone be set up over Libya. This was meant to stop Libyan military planes from attacking Benghazi and so help prevent civilians from being killed. Any Libyan aircraft flying over the country could be shot down by missiles or planes from the countries enforcing the no-fly zone. The missiles and planes could also be used to attack any military equipment on the ground capable of shooting at them.

On the day before the vote was taken at the UN, leaders of the Arab League agreed a no-fly zone should be set up over Libya. However, it insisted no foreign troops should enter the country, as this would be

considered an invasion. The Arab League is an organisation of 22 countries from the Middle East and North Africa. Libya is a member.

After the UN resolution was passed, Colonel Gaddafi announced a ceasefire. Yet few believed him, and fighting around Benghazi continued. So far fighter planes from the UK, France, Canada, Italy and the USA have taken part in enforcing the no-fly zone. Warships from several of these countries in the Mediterranean Sea have also fired missiles into Libya. These countries hope that some members of the Arab League, such as the UAE and Qatar, will also send some military aircraft to enforce the no-fly zone.

Colonel Gaddafi insists most Libyans support him. He said the bombing by foreign aircraft had killed many civilians, including children. The Libyan leader accuses the countries enforcing the no-fly zone of wanting to take over Libya because it has large supplies of oil. ■

## ITALY'S 150TH BIRTHDAY

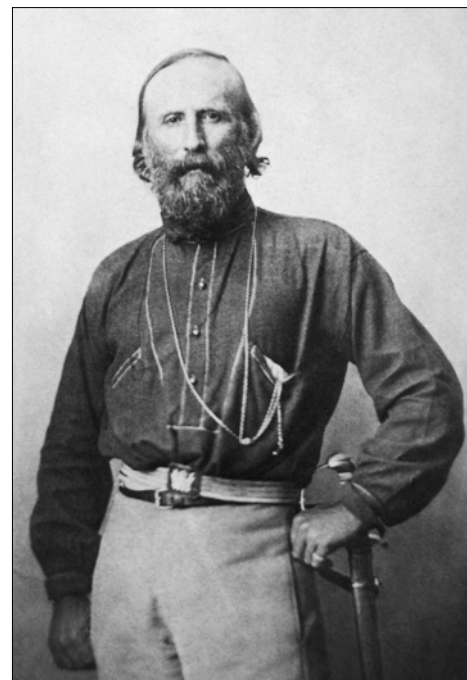
In Italy, 17th March was a national holiday. On this day in 1861, Victor Emmanuel the Second became the first king of a united Italy. Italians were therefore celebrating the 150th anniversary of the founding of their country.

Before 1861, what we now know as Italy was made up of many separate regions or areas. Some were small kingdoms, and others were Papal States – mostly controlled by the Roman Catholic Church, with a few ruled by foreign countries.

After becoming a united country Italy had kings as heads of state until 1946. Then King Umberto the Second was forced to [abdicate](#) and

a referendum, or vote in which all adults could take part, was held. Italians voted for their country to become a republic with a president and an elected parliament.

Now a prime minister, who is usually the leader of the political party (or group of parties) with the most seats in parliament, leads the country. The president, who is selected by members of parliament and regional officials for a period of seven years, is head of state, but has few powers.



*Giuseppe Garibaldi*

Several official events were held to celebrate the country's 150th birthday. These included a special performance of Nabucco, in Rome, the capital city. Nabucco is an opera written by Giuseppe Verdi (1813 – 1901), one of Italy's most famous musical composers. Military jets flew over the city and, using differently coloured smoke, traced an image of the Italian flag in the sky.

The cannon on Janiculum Hill, which overlooks the city of Rome, fired 150 times. Traditionally, this canon fires once a day at midday.

## NewsCAST

**DOWN THE DRAIN** — In 2008, thieves stole around €85 million (£74 million) worth of jewellery from a jewellery shop in Paris, the capital of France. Almost everything in the shop was taken. Although nine people were charged with the crime, not all of the stolen jewellery has been found. However, at the beginning of March, the police discovered some more of it. The jewels had been sealed in a plastic container and hidden in a drain. Inside the container were 19 rings and a few pairs of earrings. The police said these items were worth around €14 million (£12 million).

Nearby is a statue of Giuseppe Garibaldi (1807 – 1882). He is an Italian national hero. Garibaldi was a soldier and politician who fought to bring together all the regions that eventually became a united Italy.

Although Italy has been a united country for 150 years there are still many arguments among the regions. The country is split between the richer northern part and the poorer regions in the south. Many Italians who live in the north, and elected politicians who represent the area, often complain that too much of the money northern Italy pays in taxes is used to support the poorer south. ■

## CLEANING SHARKS

What does a thresher shark do after a hard day's swimming and feeding? Go to the shark wash, say marine scientists who have been studying the endangered species. The scientists spent hundreds of hours

watching the sharks in the ocean near the Philippines to find out more about the species' behaviour.

Many types of sharks **host** small parasite fish. A parasite is a creature that survives by living off another animal. These little fish swim close to the shark at all times. The sharks let the parasite fish go in and out of their teeth to clean away small bits of food.

This arrangement works for both the sharks and the parasite fish. The parasites get their food and the shark has its teeth looked after. Small pieces of food stuck between the shark's teeth are cleaned away by the fish before they become rotten. Some types of parasite fish also eat the lice that live on sharks' bodies. If the lice were to get out of control they could become a health problem for the sharks.

The marine scientists spent a lot of time watching an area of sea around a seamount, the top part of an underwater mountain. Here the water is shallow. It is also where wrasses, the type of parasite fish that live off thresher sharks, gather. The scientists say the sharks seem to deliberately swim to the top of the seamount where the wrasses are, to get 'cleaned'. The scientists say it's as if this part of the ocean is a cleaning station for sharks.

One reason this behaviour is surprising is because deeper water is safer for thresher sharks. The sharks are more likely to be attacked by other types of sharks, or even human hunters, in shallower water around a seamount.

The scientists noticed the most popular cleaning time for sharks around the seamount was in the morning. They also recorded how much time the wrasses spent cleaning different parts of the sharks'

bodies. The wrasses spent most time around the sharks' pelvic area and the least time around their gills. There was no difference between whether the wrasses cleaned male or female sharks.

Other types of shark also came to the seamount cleaning stations.



Thresher shark

The scientists say this is an example of species **prioritising** what they need. Larger sharks, which attack others, could easily prey on the smaller ones going to the cleaning stations. Yet they don't seem to do this. The scientists think this is because when they are at the seamount getting cleaned is more important for the larger sharks than hunting.

The seamount cleaning stations attract several shark species. The scientists therefore hope that in the future these parts of the ocean will become specially protected areas. ■

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**Editor:** Amber Thody

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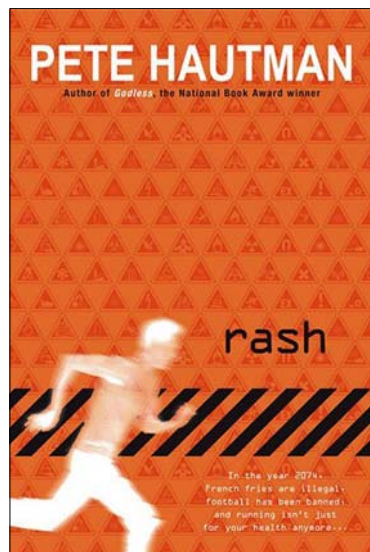
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# B O O K R E V I E W

## HAVE YOU READ ...?



It is the year 2074 and much has changed in the USA. For starters, now it's the USSA (The United Safer States of America), which now includes Canada. But those changes are minor compared with the changes to society.

Just about every freedom you can imagine has become illegal, from eating junk foods (too unhealthy), to contact sports (too dangerous), to swearing (too traumatising for those who hear

you). Everything is being monitored and scanned. Computer activities are censored and under surveillance, and schools and shopping centres have cameras and listening devices so arguments can be recorded for the courts. And if you are convicted of a crime such as swearing or pushing someone, the punishment is to be 'sold' to companies as a form of cheap labour. The economy completely depends on the work of criminals – more than 20% of the entire adult population is in prison.

Some of our society's problems have been eliminated by the new world's technology. For example, illegal drug use is no longer a problem. If someone is using drugs the solution is simple: the dopamine receptors in his or her brain can be regenerated, and the addiction literally eliminated.

The rules apply to kids too. To curb teenage anger and depression most students are required to take drugs that slow down their response times. If a student fails to take his or her daily dose, it counts as a misdemeanour and is punishable by up to a two-year prison sentence.

Bo's family is pretty normal for American society. His dad is serving a five-year sentence for road rage. His elder brother is in the middle of a three year sentence in a work camp. Bo's grandfather is an ex-convict who complains about 'the good old days' when you could hit people and smoke – another thing which is now illegal. Bo's quiet mum works hard to support what remains of the family, and manages to keep it together against all odds.

Bo has inherited his family's difficulty with following the rules, though he mostly tries to keep his head down at school. He's working on a computer assignment to develop an artificial-intelligence, and manages to express a bit of rebellion when he designs his AI as a monkey which he names Bork. Unfortunately Bo has a competitive nature, and his passion is sprinting. His arguments with other athletes on his team are bound to land him in no end of trouble sooner rather than later, and that's where Bo's story really begins.

In few words, the author conveys a deep sense of loss about the freedoms most of us take for granted, and it made me appreciate the society we live in now more than ever. I feel that the author is warning us about what could happen if the trade-offs of safety and security versus personal freedoms become as extensive as they have in the society this book describes.

I think this story is fantastic. It has elements of the famous George Orwell novel *1984*, which describes a [dystopian](#) future society. *Rash* mixes these with modern-day technologies such as artificial intelligence and gene therapy, all set in the futuristic, super-safe, American society. I found myself amazed with the pace and turns of this novel. I enjoyed its complex paths, beginning in the setting of school and home life and quickly uprooting Bo to fend for himself in a harsh and bitter climate of mistrust and anger.

This book is best suited for readers aged 13 and up and contains a little violence and some swearing.

*Rash* by Pete Hautman. Simon & Schuster Children's Publishing

Reviewed by **Chris Tarn**

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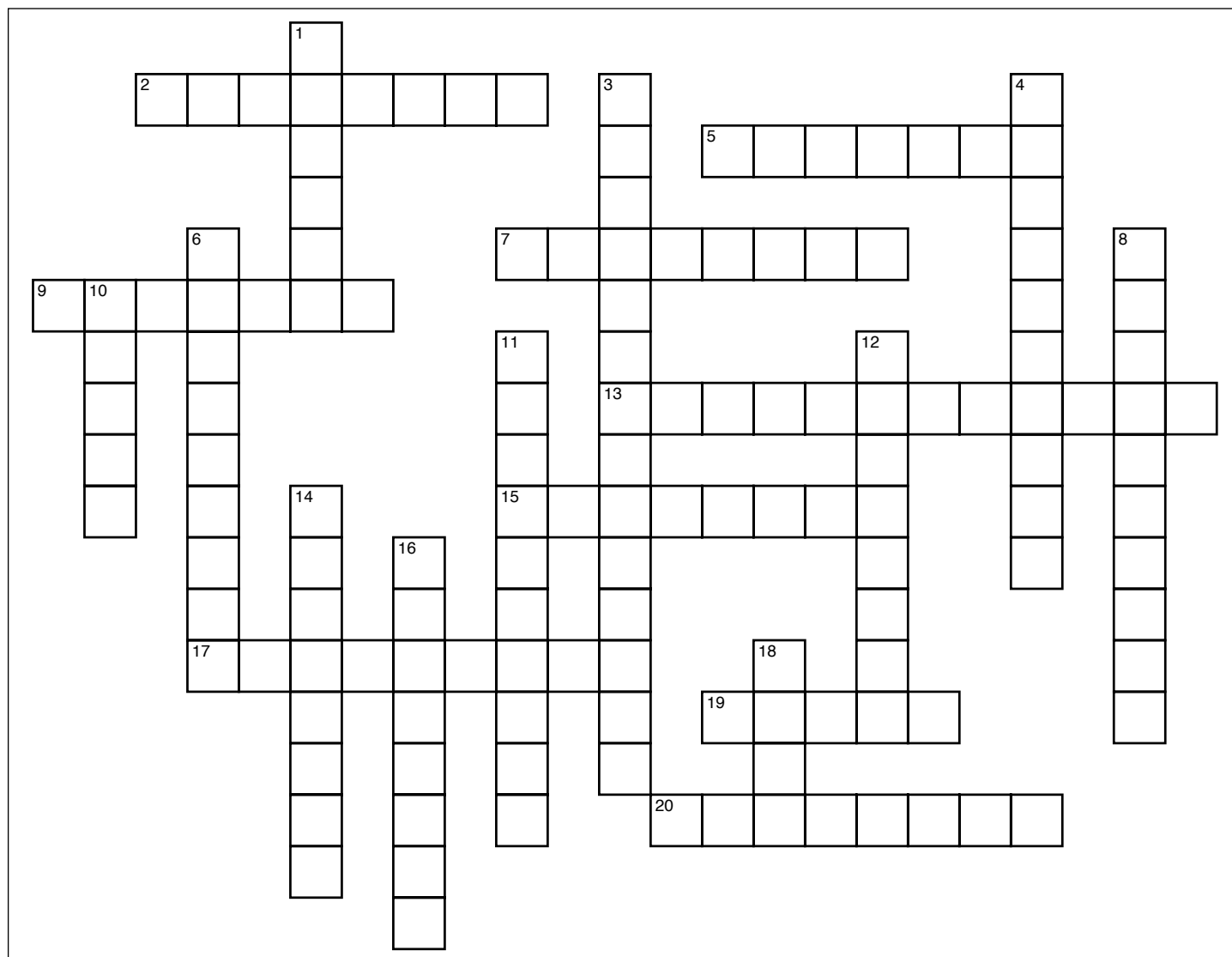
Complete the form and tell us why you enjoyed the book. If we review your choice, we'll mention your name and include some of your comments.



# ISSUE 141

## GLOSSARY PUZZLE

**INSTRUCTIONS:** ① Complete the crossword. The answers are highlighted in orange in the news stories. There are 25 words highlighted and you need 20 of them to complete the crossword. ② Once you have solved the crossword go to the word search on the next page ➡



### Across

- 2 Verb** Torn or burst open  
**5 Noun** The position in which the parts of the body are arranged when standing, sitting or moving around  
**7 Verb** Ordered to leave a country as a punishment  
**9 Noun (Plural)** Extreme shortages of food  
**13 Verb** Born again in another body after dying  
**15 Noun (Plural)** Short funny pieces of acting that are usually part of a comedy show  
**17 Adjective** A condition of society in which everything is as bad as it can be  
**19 Noun (Plural)** Measured quantities of something, especially medicine, taken at one time  
**20 Noun** The right of a person, group or region to act without consulting another person or official body

### Down

- 1 Verb** To make a big effort  
**3 Noun (Plural)** Troops sent to make a military force stronger  
**4 Verb** Deliberately spoilt or ruined a special or sacred place  
**6 Verb** Caused to move or take the place of  
**8 Noun (Plural)** Marks made in paper that can only be seen when it is held up to the light  
**10 Adjective** Watchful and prepared to react  
**11 Noun** Mammals whose young are carried and suckled in a pouch on the mother's belly  
**12 Noun** The merciless killing of a large number of people  
**14 Noun** Scattering of people who used to belong to one country or region  
**16 Noun** Enduring pain and hardship without complaint  
**18 Noun** An animal or plant on which a parasite lives

# ISSUE 141

## GLOSSARY PUZZLE *CONTINUED*

R E I N F O R C E M E N T S T C R M  
 E U Q W T Y S G B X S E N I M A F A  
 I D P G A L E R T N Y P Z H Z H S R  
 N E O T I M J Y P P O S T U R E S S  
 C H V S U Z U Y G N I M G Y H N C U  
 A S Z D E R R Y S L B Y O C M J A P  
 R I P C D S E T H H T Q T G C B N I  
 N N S X N L O D J B A E P N S C Q A  
 A A Z Q W I G H A S K K A S N O T L  
 T B E X C D U E K S X I B I U N Q S  
 E B K I W V Z R U W P S E V I R T S  
 D R S H B H A U T O N O M Y D Z L A  
 L M A D O M M E T E R C A S S A M Y  
 R T L G R D H S S Q E M K L H O S T  
 D F H E M I Y Z A R O P S A I D G X  
 F A T F N D E T A R C E S E D F H N  
 J A C I A E C L E K C B O L M S K K  
 W C X S L N V Y P H S N W K B G L Z

**INSTRUCTIONS:** ③ Find 19 of the 20 crossword answers in the word search. Words can go vertically, horizontally, diagonally and back to front. ④ After finding the 19 words write down the 20th (or missing) word under the puzzle.

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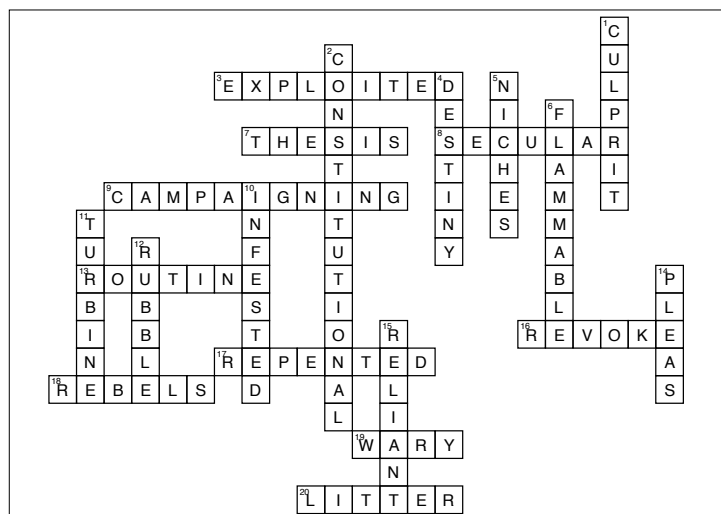


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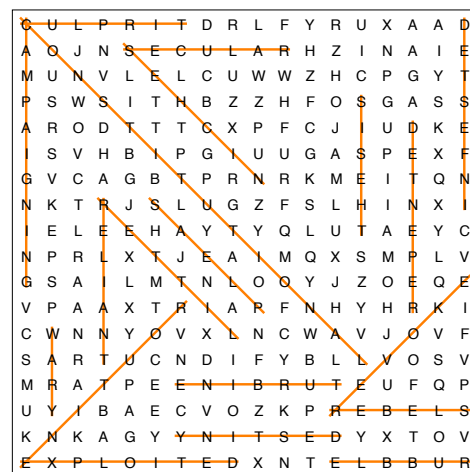
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MISSING WORD ANSWER =



ISSUE 140 ANSWERS



F L A M M A B L E